Rule 1.126

CLAIMS

I claim:

1. An improved apparatus for substrate cleansing comprising:
a planar substrate having a top side; and
means to scrub clean the planar substrate top side.

2. The apparatus of claim 1, wherein means to scrub clean the planar substrate top side further comprises:
at least one bead of predetermined diameter moving on and striking the substrate top side; and
means for movement of each bead onto the substrate top side.

3. The apparatus of claim 2, wherein bead composition is selected from the group consisting of: metal, coated metal, magnetic material, coated magnetic material, positively charged agarose material, negatively charged agarose material, coated positively charged agarose material, coated negatively charged agarose material, positively charged latex material, negatively charged latex material, coated positively charged latex material, coated negatively charged latex material, glass, coated glass, resin, coated resin, ceramic, coated ceramic, plastic, negatively charged plastic, positively charged plastic, coated plastic, negatively charged coated plastic, or positively charged coated plastic.

4. The apparatus of claim 2, wherein means for movement of each bead on the substrate top side further comprises at least one movement means selected from the group consisting of:

substrate motion, external permanent magnets, external electromagnets, means for creating a varying external magnetic field, means for creating a vortex liquid, means for suspending beads in a solution and means for pressurized pumping of the suspended bead solution against the substrate top side.

5. The apparatus of claim 4 wherein the solution comprises at least one medium selected from the group consisting of: aqueous, air, and inert gas.

6. The apparatus of claim 4 wherein the substrate and solution are contained within a closed vessel.

7. An improved apparatus for isolation of unreacted bioreactive material and substrate cleansing comprising:

a planar semiconductor substrate having a top side;

a plurality of sense sites formed within the substrate top side further defining a matrix of sense sites, wherein each sense site comprises a well to receive probe molecules;

means to mechanically apply or synthetically construct a probe spot sample to a region of sense sites;

means to separate the probe spot sample into multiple, separate sense site wells; and

means to scrub clean the planar semiconductor substrate top side.

8. The apparatus of claim 7, wherein means to scrub clean the planar semiconductor substrate top side and means to

separate the spot sample into multiple, separate sense site wells further comprise at least one bead of sufficient diameter moving on or contacting the substrate top side so that no bead can enter or drop down into the sense site wells, and means for movement or contact of each bead on the substrate top side.

9. The apparatus of claim 8, wherein bead composition is selected from the group consisting of: metal, coated metal, magnetic material, coated magnetic material, positively charged agarose material, negatively charged agarose material, coated positively charged agarose material, coated negatively charged agarose material, positively charged latex material, negatively charged latex material, coated positively charged latex material, coated negatively charged latex material, glass, coated glass, resin, coated resin, ceramic, coated ceramic, plastic, negatively charged plastic, positively charged plastic, coated plastic, negatively charged coated plastic, or positively charged coated plastic.

10. The apparatus of claim 9, wherein means for movement of each bead on the substrate top side further comprises at least one means for movement selected from the group consisting of: substrate motion, external permanent magnets, external electromagnets, means for creating a varying external magnetic field, means for creating a vortex liquid, means for suspending beads in a solution and means for pressurized

pumping of the suspended bead solution against the substrate top side.

11. The apparatus of claim 10, wherein bead diameter ranges from 5 microns to 1000 microns.

12. The apparatus of claim 10, wherein bead diameter exceeds 1000 microns.

13. The apparatus of claim 10, wherein bead diameter is less than 5 microns.

14. The apparatus of claim 10 wherein the solution comprises at least one medium selected from the group consisting of: aqueous, air, and inert gas.

15. The apparatus of claim 14 wherein the substrate and solution are contained within a closed vessel.

16. A method for isolation of unreacted bioreactive material and substrate cleansing, the method comprising the steps of:

a. denaturing probe spot DNA by heating to 95 degrees C for 15 minutes;

b. applying all probe spots to the array surface and drying;

c. coating the array surface with salmon sperm solution;

d. allowing the coated array surface to stand for a predetermined period of time;

e. applying means to link the probe molecules to the array surface;

f. rinsing the coated array surface with 2X SSC;

g. preparing a bead solution comprising 2X SSC or histidine and latex coated beads;

h. providing means to contain the bead solution;

i. providing means for bead movement;

j. placing the contained bead solution in working proximity with means for bead movement;

k. submerging the substrate top surface in the bead solution;

l. initiating means for bead movement;

m. allowing the substrate to be treated within the contained bead solution while means for bead movement is actively engaged for a predetermined period of time;

n. immediately rinsing the substrate top surface with 2X SSC twice at room temperature for a predetermined period of time for each wash;

o. allowing the substrate top side to dry while being stored in a covered environment;

p. taking baseline electrical measurements; and

q. covering and storing the substrate until ready for hybridization.

17. The method of claim 30, wherein a step of blocking and fixing stationary DNA to the sense chip further comprises the steps of:

a. to a clean 1.5 ml tube, adding 25 μL of Master mix (0.1g dextran sulfate, 5mL formamide, and 1 ml 20X SSC

and water up to 7 ml, pH 7.0) and enough fractionated Salmon Sperm DNA to reach a concentration of 250 μg/ml;

b. heating the mixture to 37 degrees centigrade and quickly applying it to the surface of the sense chip, covering the sense chip cavity with a supplied plastic cover, and placing the sense chip on a slow rocker platform in 37 degrees centigrade incubator for 30 minutes;

c. rinsing the sense chip twice with 2X SSC solution at 45 degrees centigrade for 2 minutes, followed by 0.1x SSC and pure water for 2 minutes each;

d. applying means to link the probe molecules to the array surface;

e. in a separate container, combining beads with 2X SSC or histidine;

f. placing the bead based solution in working proximity to with means for bead movement;

g. securing the sense chip on means for bead movement;

h. activating means for bead movement;

i. treating the microarray for 2 minutes;

j. removing the sense chip from the base and quickly rinsing the sense chip in 2X SSC at 45 degrees centigrade for 2 minutes;

k. rinsing the sense chip for 2 minutes in 0.1X SSC at 45 degrees centigrade, and a final time in pure water for 30 seconds;

l. allowing the sense chip to air dry for 10 minutes and, if desired, replacing plastic cover onto the sense chip; and

m. placing the sense chip into a testing machine and reading the resistance and/or conductance levels of each sense site.